<< SPURS Home

Home | SPURS: Why? | SPURS: How? | SPURS Webinars | Education and Outreach Resources | Contact Info

SPURS Webinars

The SPURS project represents the collaborative efforts between a diverse group of scientists spanning national and international borders, from multiple organizations. These include, but are not limited to, physical oceanography experts and climate scientists from NASA, researchers from the Woods Hole Oceanographic Institution, and research professors from The University of North Carolina, Wilmington, to name a few. The following individuals have been highlighted for the well-received webinar presentations put together with the help of COSEE-Ocean Systems, on their involvement with the SPURS expeditions.

Click on the images for a closer view!

Ocean Thinking: Inside and Outside of the Box

September 17 - October 1, 2013

Changes In Latitude

Presented by Julius Busecke - September 17, 2013

It may be easy to think about studying the ocean by looking at a small section of it, but the reality is that water is constantly on the move. While highlighting his own research within the SPURS area, Julius will demonstrate how the atmosphere affects the water cycle both on land and in the ocean, and how the movement of seawater plays a crucial role in our understanding global ocean circulation.

Julius Busecke is a Graduate Research Assistant at Lamont-Doherty Earth Observatory, Columbia University. He received his B.Sc. from the University of Kiel, Germany in 2010.

From Skin to Deep

Presented by Stephen Riser - September 24, 2013

The atmosphere is not the only thing that affects the ever-changing ocean. Using in-water measurement tools such as profiling floats, as well as satellite data from SMOS and Aquarius instruments during the SPURS mission cruises, Dr. Riser has examined salinity changes in the SPURS area from the surface of the water to the depths of the ocean. Ultimately, Dr. Riser is seeking to investigate long term changes – by using a combination of observations from above and below.

Dr. Stephen Riser is a Professor in the School of Oceanography at the University of Washington. His primary interests are in the ocean's role in climate, and in deducing the general circulation of the ocean and ocean/atmosphere/ice interactions through direct observations of the ocean circulation. He is also increasingly thinking about the interactions between physical aspects of the ocean circulation and biogeochemical properties of the ocean.

Balanced Budget? Oh, Buoy!

Presented by Tom Farrar - October 1, 2013

Determining ocean salinity trends is not a simple task. With differences in the amount of water, heat, and salt constantly coming and going, as well as gradients across depth and latitude, it's a challenging task to undertake. Dr. Farrar will share what data from a fixed mooring within the SPURS area can tell us about the overall "salt budget" for one of the saltiest parts of the world's ocean.

Dr. Tom Farrar is an Associate Scientist at Woods Hole Oceanographic Institution. His research interests include air-sea interaction and exchange; dynamics and thermodynamics of the upper ocean; tropical dynamics and equatorial waves; oceanic internal waves and eddies; satellite oceanography; and ocean observing and instrumentation. These interests are pursued from an observational perspective using in situ observations, satellite observations, and, in some cases, laboratory and numerical models to test hypotheses and test or formulate simplified physical models that aid understanding.

Seeking Salt: Measuring a Key Ingredient of Climate

February 26 – March 12, 2013

Archives of the first three-part webinar series (below) are available to watch. This series focused on how SPURS scientists are seeking to better understand ocean salinity, which affects everything from the water cycle to climate change. Each webinar features an interactive concept map loaded with educational resources that can serve as a starting point for educators to begin to "sprinkle" ocean salinity content into your teaching. Each webinar is also paired with applicable Next Generation Science Standards for easy integration.

From Sailing Ships to Satellites: Studying Salinity Through A Sensor Web

Presented by Dr. Eric Lindstrom – February 26, 2013

What is a sensor web, and how does it help SPURS? Dr. Lindstrom takes us on a trip through salinity research, revealing how ocean exploration has evolved over time and the combination of approaches we're now using to to investigate what's happening in the unique "ocean desert" of the North Atlantic.

Dr. Eric Lindstrom is a Program Scientist in the Science Mission Directorate at NASA Headquarters in Washington D.C. He has degrees in Earth and Planetary Sciences from Massachusetts Institute of Technology (1977) and Physical Oceanography from the University of Washington (1983). His scientific interests include circulation of the ocean and air-sea exchange processes. Read more about Eric here.

Salinity's Connection to Climate Change and an Accelerated Water Cycle

Presented by Dr. Raymond Schmitt – March 5, 2013

What affects ocean salinity, and why should we care? The saltiness of the ocean is controlled by the water cycle. And the temperature and salinity of ocean water together control ocean density - the crucial driver of ocean circulation. Dr. Schmitt explains how ocean circulation works and its profound impacts on the climate.

SPURS Chief Scientist Dr. Raymond Schmitt is a Senior Scientist at Woods Hole Oceanographic Institution. Dr. Schmitt earned his Ph.D. in physical oceanography from the University of Rhode Island and his B.S. in physics from Carnegie Mellon University. His research interests include oceanic mixing processes such as "salt fingers" and the oceanic freshwater cycle. He has been a J.S. Guggenheim fellow and is a Fellow of the American Geophysical Union. Read more about Ray here.

SPURS Results and the Future of Salinity Exploration

Presented by Dr. Fred Bingham – March 12, 2013

What have we learned about the SPURS site and what's next? The interdisciplinary cruise undertaken by SPURS scientists involved the coordination of an armada of technology - from in-water instruments to shipboard measurements to satellites in orbit around Earth. Dr. Bingham shows us the results of the team's research, including real data collected during the cruise.

Dr. Fred Bingham is a Professor in the Department of Physics and Physical Oceanography at the University of North Carolina at Wilmington. His research interests include global distributions of sea surface salinity and large scale regional physical oceanography - the Kuroshio, the western North and Equatorial Pacific, and Onslow Bay, North Carolina.

This material is based upon work supported by NASA under NASA Jet Propulsion Laboratory Subcontract No. 1459277. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of NASA.

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<< SPURS Home

EDUCATION & OUTREACH

SPURS
Salinity Processes in the Upper Ocean Regional Study

Home | SPURS: Why? | SPURS: How? | SPURS Webinars | Education and Outreach Resources | Contact Info

SPURS Webinars

- From Sailing Ships to Satellites: Studying Salinity Through a Sensor Web
- Salinity's Connection to Climate Change and an Accelerated Water Cycle
- Follow that Salt! SPURS Results and the Future of Salinity Exploration
- Ocean Thinking: Changes in Latitude
- Ocean Thinking: From Skin to Deep
- Ocean Thinking: Balanced Budget? Oh, Buoy!

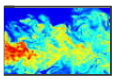
Ocean Thinking: Changes in Latitude

It may be easy to think about studying the ocean by looking at a small section of it, but the reality is that water is constantly on the move. While highlighting his own research within the SPURS area, Julius Busecke will demonstrate how the atmosphere affects the water cycle both on land and in the ocean, and how the movement of seawater plays a crucial role in our understanding global ocean circulation.

Webinar Archive

You can watch a video of the webinar below. Below the video is Julius' interactive concept maps so that you may follow along with the presentation.

View related videos:


The Turbulence Cascade
[vimeo, 01:08]


Optimizing Research Methods
[vimeo, 01:21]


Salinity Balance is Like a Bank Account
[vimeo, 01:19]


Getting the Salinity Right
[vimeo, 01:33]

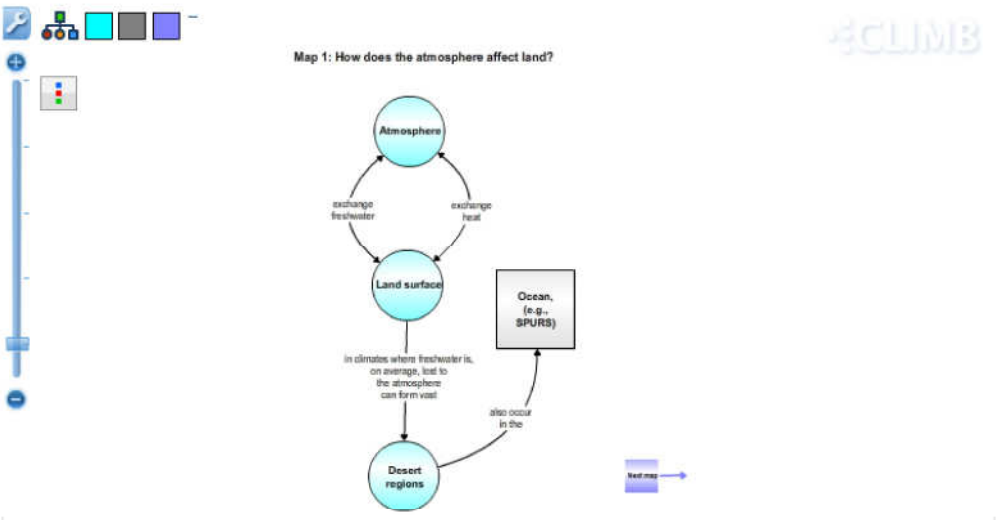
38:20 HD

Click here for a transcript of the Q&A portion of this video (PDF, 84KB).

Concept Map: How Does the Atmosphere Affect Land?

This webinar featured a series of three interconnected maps. The first map explores how the atmosphere and land interact, and how there can be desert-like regions both on land and in the ocean. Moving over to the ocean, the second map discusses how the atmosphere's wind, the rotating earth and the ocean surface interact to create the mixed layer and to setup ocean circulation. The final map illustrates the lateral movement of water from the subtropics to the tropics, which affects the salinity in the SPURS research area.

You can explore the first map in the window below, or save it to your own CLIMB account by clicking on the light blue wrench in the upper left corner and selecting Copy Map to My Maps. To view these maps as PDFs click here (PDF, 276 KB).



This concept map forms the basis of Julius' presentation. Hover over the concepts to uncover additional resources, or save this map to your own CLIMB account by clicking on the light blue wrench in the upper left corner and selecting "Copy Map to My Maps".

Applicable Next Generation Science Standards

- Influence of Engineering, Technology, and Science on Society and the Natural World *Crosscutting Concept:* New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology (HS-ESS2-2).
  - *[HS-ESS2-2]* Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth's systems.

- *Disciplinary Core Idea:* Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents (MS-ESS2-6).
  - *[MS-ESS2-6]* Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

About the Presenter

Julius Busecke is a Graduate Research Assistant at Lamont-Doherty Earth Observatory, Columbia University. He received his B.Sc. from the University of Kiel, Germany in 2010.

SPURS Blog

Slicing the Ocean [NASA Earth Observatory]

Julius introduces us to the towed CTD instrument, known as SeaSoar, that will be used on the Sarmiento portion of the SPURS cruise

Endeavor Update 13-04-06 [NASA Earth Observatory]

This posts talks about the deployment of some of the SeaSoar instruments that Julius mentions in his talk, as well as finding the pockets of freshwater that he described

Nights on a Research Vessel [NASA Earth Observatory]

Julius Busecke describes what a night shift is like on the SPURS cruise

Resources

Density: Sea Water Mixing & Sinking [NASA Aquarius]

Temperature and salinity help govern the density of seawater, which is a major factor controlling the ocean's vertical movements and layered circulation

Salt of the Earth: Ocean Atmosphere Circulation Helps Moderate Climate [NASA Aquarius]

Things that happen now will still be manifest hundreds of years in the future

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<< SPURS Home

Home | SPURS: Why? | SPURS: How? | SPURS Webinars | Education and Outreach Resources | Contact Info

SPURS Webinars

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Ocean Thinking: From Skin to Deep

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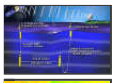
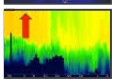
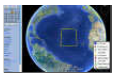
Webinar Archive

You can watch a video of the webinar below. Below the video is the concept map that Dr. Riser presented, so that you can follow along with the presentation.

View related videos:


Communicating with Floats
[vimeo, 00:37]


Argo Float Modifications
[vimeo, 01:28]


From Millimeters to Kilometers
[vimeo, 01:13]

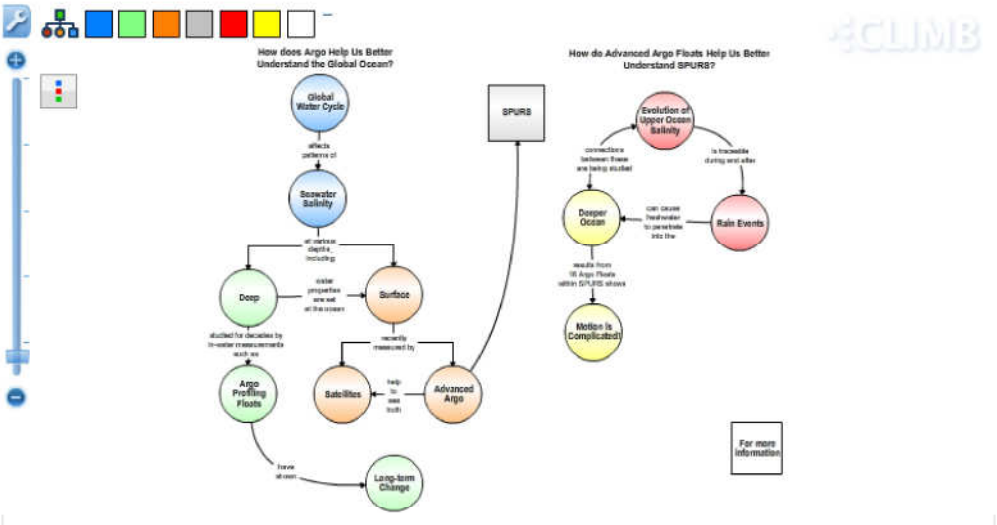

Sampling Around
[vimeo, 01:31]

Click here for a transcript of the Q&A portion of this video (PDF, 86KB).

Concept Map: How Does Argo Help Us Better Understand the Global Ocean, and How Do Advanced Argo Floats Help Us Better Understand SPURS?

In Dr. Riser's webinar, he presented a concept map that explored two points – that tools such as Argo floats can help to provide a better picture of the ocean, and that the combination of new float technology with other tools deployed in SPURS (such as data from the Aquarius satellite) can contribute to seeing a full picture of the ocean, from "skin to deep".

You can explore the concept map in the window below or save it to your own CLIMB account by clicking on the light blue wrench in the upper left corner and selecting Copy Map to My Maps. To view this map as a PDF, click here (PDF, 135 KB).



This concept map forms the basis of Dr. Risers' presentation. Hover over the concepts to uncover additional resources, or save this map to your own CLIMB account by clicking on the light blue wrench in the upper left corner and selecting "Copy Map to My Maps".

Applicable Next Generation Science Standards

- *[HS-ESS2-5]* Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.
- Interdependence of Science, Engineering, and Technology *Crosscutting Concept:* Scientific discoveries about the natural world can often lead to new and improved technologies, which are developed through the engineering design process (3-PS2-4).

- *[3-PS2-4]* Define a simple design problem that can be solved by applying scientific ideas about magnets.

About the Presenter

Dr. Stephen Riser is a Professor in the School of Oceanography at the University of Washington. His primary interests are in the ocean's role in climate, and in deducing the general circulation of the ocean and ocean/atmosphere/ice interactions through direct observations of the ocean circulation. He is also increasingly thinking about the interactions between physical aspects of the ocean circulation and biogeochemical properties of the ocean.

SPURS Blog

Snakes on a Ship [NASA Earth Observatory]

Dr. Ben Hodges explains what a "salinity snake" is and how it helps to understand salinity processes at the surface of the ocean

Measurements by Long-Term Autonomous Platforms in SPURS [NASA Earth Observatory]

Eric Lindstrom talks about the multitude of instrumentation deployed in the SPURS region to understand the near-surface layer of the ocean

Managing SPURS Data [NASA Earth Observatory]

Organizing and making sense of the data being generated within the SPURS region is a big task with many players involved!

Resources

The Argo Homepage [ARGO]

Describes the project and provides links to buoy data - a great place to start looking at the Argo program

How To Interpret Argo Profiles [Way Down South]

This website, from an educator in New Zealand, includes many activities and ways to utilize data in a K-12 setting

Adopt an Argo Float [Way Down South]

This page describes two ways in which a classroom can "adopt" an Argo float

The Scripps Institution of Oceanography Argo Website [SCRIPPS]

An easy-to-use site that brings you directly to the Argo data. Select the view that you want to see and then click on a buoy to reveal its data

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<< SPURS Home

Home | SPURS: Why? | SPURS: How? | SPURS Webinars | Education and Outreach Resources | Contact Info

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Determining ocean salinity trends is not a simple task. With differences in the amount of water, heat, and salt constantly coming and going, as well as gradients across depth and latitude, it's a challenging task to undertake. Dr. Farrar shares what data from a fixed mooring within the SPURS area can tell us about the overall "salt budget" for one of the saltiest parts of the world's ocean. His story includes describing the nerve-wracking process of deployment and recovery of the mooring, as well as how data from the buoy can work in conjunction with satellite data to produce a more complete picture of the ocean's "salt budget".

Webinar Archive

You can watch a video of the webinar below. Below the video is the concept map that Dr. Farrar presented, so that you can follow along with the presentation.

View related videos:


Setting the Properties of the Ocean
[vimeo, 04:55]


SPURS Come In Pairs: The Next Phase
[vimeo, 01:33]

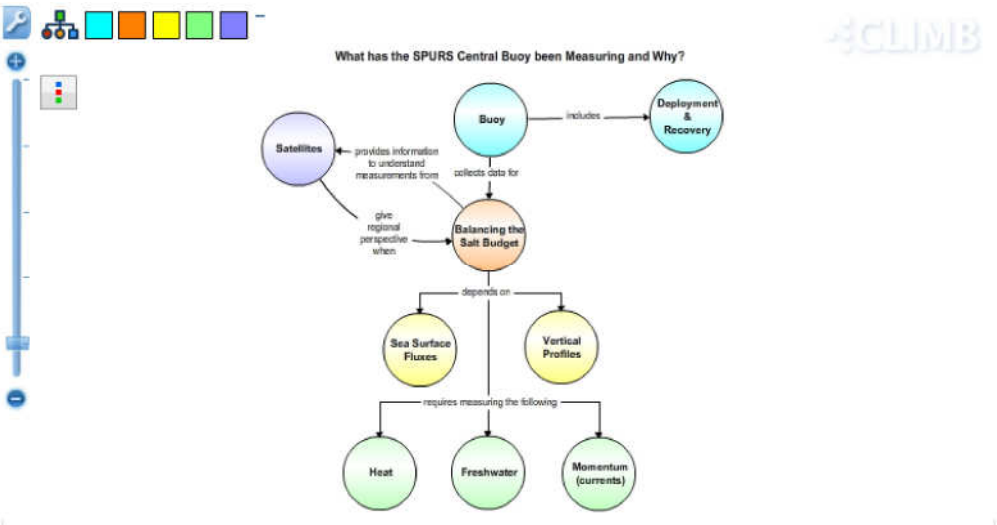

Tuning up the Salinity Model
[vimeo, 01:32]

Click here for a transcript of the Q&A portion of this video (PDF, 77KB).

Concept Map: What Has the SPURS Central Buoy Been Measuring and Why?

Dr. Farrar's concept map illustrates the diversity of measurements that can be gathered from one "platform" and how those measurements can inform the greater salt budget. The different instruments measuring heat, freshwater and current movement are showcased.

You can explore the concept map in the window below or save it to your own CLIMB account by clicking on the light blue wrench in the upper left corner and selecting Copy Map to My Maps. To view this map as a PDF, click here (PDF, 108 KB).



This concept map forms the basis of Dr. Farrar's presentation. Hover over the concepts to uncover additional resources, or save this map to your own CLIMB account by clicking on the light blue wrench in the upper left corner and selecting "Copy Map to My Maps".

Applicable Next Generation Science Standards

- Disciplinary Core Idea: Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents (MS-ESS2-6).
- Interdependence of Science, Engineering, and Technology *Crosscutting Concept:* Scientific discoveries about the natural world can often lead to new and improved technologies, which are developed through the engineering design process (3-PS2-4).
  - *[3-PS2-4]* Define a simple design problem that can be solved by applying scientific ideas about magnets.

About the Presenter

Dr. Tom Farrar is an Associate Scientist at Woods Hole Oceanographic Institution. His research interests include air-sea interaction and exchange; dynamics and thermodynamics of the upper ocean; tropical dynamics and equatorial waves; oceanic internal waves and eddies; satellite oceanography; and ocean observing and instrumentation. These interests are pursued from an observational perspective using in situ observations, satellite observations, and, in some cases, laboratory and numerical models to test hypotheses and test or formulate simplified physical models that aid understanding.

SPURS Blog

Mooring Deployment [NASA Earth Observatory]

From the first SPURS cruise blog, Dr. Eric Lindstrom describes the deployment of the central mooring in September of 2012

The WHOI Buoy [NASA Earth Observatory]

An introduction to the WHOI Mooring and plans for its recovery on the latest SPURS cruise blog

WHOI Mooring Recovery [NASA Earth Observatory]

This post details the recovery of the WHOI Mooring featured in this webinar

Resources

Data From the SPURS Central Mooring [Upper Ocean Processes Group]

A website that allows you to browse the data collected by the SPURS Central mooring during the SPURS cruise

SPURS Central Mooring [Upper Ocean Processes Group]

A diagram of the entire mooring and all of its instruments

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<< SPURS Home

Home | SPURS: Why? | SPURS: How? | SPURS Webinars | Education and Outreach Resources | Contact Info

From Sailing Ships to Satellite: Studying Salinity Through A Sensor Web

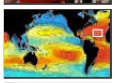
What is a sensor web, and how does it help SPURS? Dr. Eric Lindstrom takes us on a trip through salinity research, revealing how ocean exploration has evolved over time. The SPURS team took part in an international collaborative effort to better understand this fundamental part of the ocean and climate system, and used a combination of approaches to investigate what's happening in the unique "ocean desert" of the North Atlantic.

Webinar Archive

View other videos by this scientist:


Earth's Salinity Balance
[vimeo, 03:24]


The Importance of Salinity Balance
[vimeo, 02:24]


The North Atlantic's Ocean Desert
[vimeo, 01:35]


SPURS Come In Pairs: The Next Phase
[vimeo, 01:33]

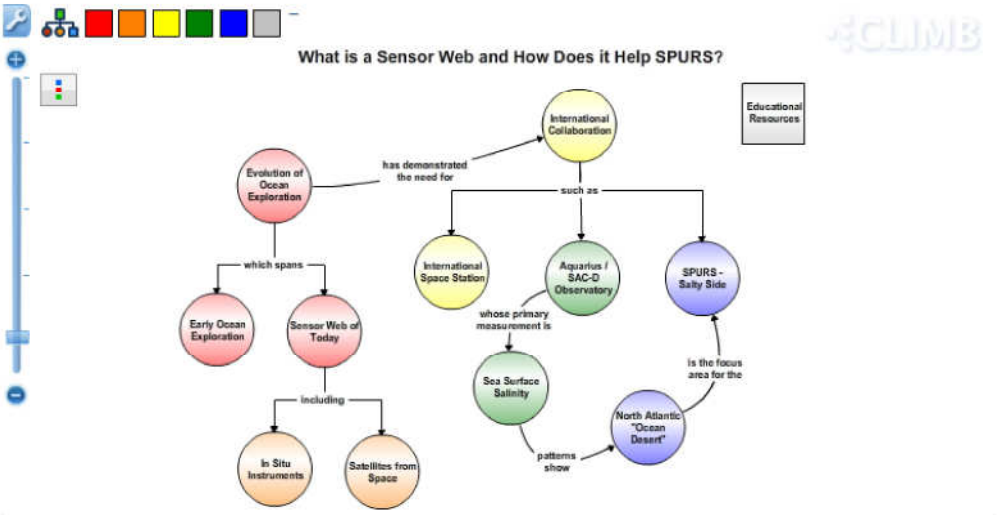

Optimizing Research Methods
[vimeo, 01:21]

More videos *[vimeo]*

47:30 HD

Click here for a transcript of the Q&A portion of this video (PDF, 76KB).

Concept Map: What is a Sensor Web and How Does it Help SPURS?



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About the Presenter

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Seaglider #189 Away! [NASA Earth Observatory]
The Seagliders launched from R/V Knorr are meant to repeatedly survey a limited region of the ocean, measuring temperature, salinity, oxygen, chlorophyll fluorescence, and optical backscatter

NOAA Contributions to SPURS [NASA Earth Observatory]
NOAA is the key agency when it comes to monitoring the global ocean with measurements in the water

Measurements by Long-Term Autonomous Platforms in SPURS [NASA Earth Observatory]
The sentinel instruments on Argo floats, Seagliders, and Lagrangian floats provide a larger-scale context for the SPURS moorings

Prawlers, Engineers, and the Future of Oceanography at Sea [NASA Earth Observatory]
Seeing the Prawler used in SPURS after years of development is the light at the end of the tunnel

Managing SPURS Data [NASA Earth Observatory]
The value of the SPURS dataset comes from analyzing the measurements made by all of the instruments at a variety of time and space scales

Hello, Knorr? It's The International Space Station Calling [NASA Earth Observatory]
A talk with ISS is symbolic of the many and growing links between the exploration of the solar system and the exploration of the ocean

Space Station for Educators [NASA]
Currently active education-related experiments gleaned from the first ten years of continuous human presence on the ISS (K-12 educators)

Space Station for Kids [NASA]
NASA research aboard the International Space Station (K-12)

Life In Space: International Space Station [Discovery Education]
An environment with almost no gravity challenges humans living in space (middle school)

Satellite Observations in Science Education [University of Wisconsin]
Using satellite observations to improve the teaching and learning of the Earth system (high school and higher)

Earth Math Educator Guide [NASA]
Making sense out of climate change, quantitatively (6-12)

MY NASA DATA [NASA]
Mentoring and inquiry using NASA data on atmospheric and earth science for teachers and amateurs (K-12 educators and students)

NASA Earth Observatory's Experiments [NASA]
Interactive experiments to teach about the art and science of space-based remote sensing (all ages)

NASA Earth Observatory [NASA]
Images, maps, features, news, and notes from NASA Earth Observatory

Education: Student Outcomes [NASA Aquarius]
Twenty three student outcomes, addressed by Aquarius EPO materials and aligned with National Science Education Standards, North American Association for Environmental Education standards, and Ocean Literacy standards

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<< SPURS Home

Home | SPURS: Why? | SPURS: How? | SPURS Webinars | Education and Outreach Resources | Contact Info

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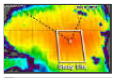

Resolving Salinity Maximum Questions
[vimeo, 02:18]


An Intensification of Extremes
[vimeo, 01:25]


A Delicate Balance
[vimeo, 01:27]

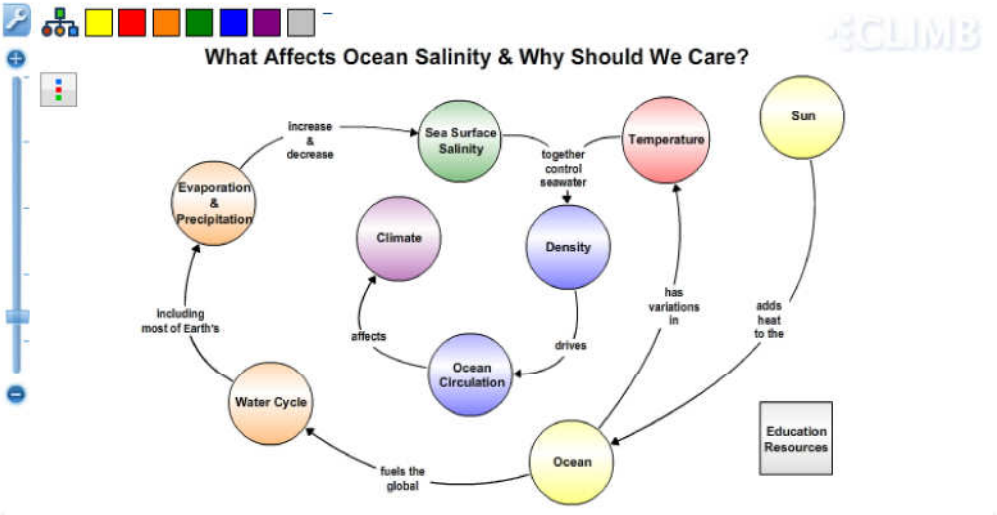

Getting the Salinity Right
[vimeo, 01:33]

More videos *[vimeo]*

44:26

Click here for a transcript of the Q&A portion of this video (PDF, 82KB).

Concept Map: What Affects Ocean Salinity and Why Should We Care?



This concept map forms the basis of Dr. Schmitt's presentation. Hover over the concepts to uncover additional resources, or save this map to your own CLIMB account by clicking on the light blue wrench in the upper left corner and selecting "Copy Map to My Maps".

Applicable Next Generation Science Standards

- *Disciplinary Core Idea:* Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents (MS-ESS2-6).
  - *[MS-ESS2-6]* Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

About the Presenter

SPURS Chief Scientist Dr. Raymond Schmitt is a Senior Scientist at Woods Hole Oceanographic Institution. Dr. Schmitt earned his Ph.D. in physical oceanography from the University of Rhode Island and his B.S. in physics from Carnegie Mellon University. His research interests include oceanic mixing processes such as "salt fingers" and the oceanic freshwater cycle. He has been a J.S. Guggenheim fellow and is a Fellow of the American Geophysical

Union. Read more about Ray here.

SPURS Planning Blog [Blogspot]
Chief Scientist Raymond Schmitt blogs from the R/V Endeavor during the second SPURS cruise

Ocean Salinity Viewed from Sea and Space [NASA Earth Observatory]
NASA Program Scientist Eric Lindstrom describes why scientists want to spend six weeks at sea measuring ocean saltiness

Are We There Yet? [NASA Earth Observatory]
It takes about a week from Woods Hole to reach our study site at 25N, 38W, giving us plenty of time to check and re-check instruments, provide training in various procedures, and get to know our work mates

Profiling Salinity from the Ship [NASA Earth Observatory]
A workhorse of our voyage is the two primary means of measuring salinity from the ship: the Conductivity, Temperature, and Depth (CTD) instruments

Seaglider #189 Away! [NASA Earth Observatory]
The Seagliders launched from R/V Knorr are meant to repeatedly survey a limited region of the ocean, measuring temperature, salinity, oxygen, chlorophyll fluorescence, and optical backscatter

Starting A Career In Oceanography And The Global Water Cycle [NASA Earth Observatory]
The SPURS work has renewed interest in the broader community in studying the ocean to better understand the global water cycle, heating and cooling of the oceans, and oceanic mixing

The Water Cycle - Now You See It, Now You Don't [NASA Aquarius]
This activity focuses on two aspects of the water cycle: evaporation and condensation

Droplet and the Water Cycle [NASA]
...and so begins the adventure of Droplet, the water molecule, as he enters the great water cycle - condensing, precipitating, infiltrating, running off, and evapotranspiring - and starts his journey home

Go With the Flow [NASA]
In this game, you "Go with the Flow" only after you have fixed the currents to take you where you want to go

Our Mission to Planet Earth [NASA]
A guide to teaching earth system science

Liquid Rainbow [NASA Aquarius]
When solutions of two different densities meet, the lower density solution will move on top of the higher density solution, resulting in a layering or stratification of the solutions

Evaporation Investigation [NASA Aquarius]
The ocean is an integral part of the water cycle and is connected to all of the earth's water reservoirs via evaporation and precipitation

Graphing Oceanographic Data [Cal-Echoes/Scripps Classroom Connection]
Students will review graphing and data interpretation using commonly collected physical oceanographic data

Density: Sea Water Mixing & Sinking [NASA Aquarius]
Temperature and salinity help govern the density of seawater, which is a major factor controlling the ocean's vertical movements and layered circulation

Interactive Data Tools for Changes in Salinity Over Time [NASA JPL]
Annual cycle mlaps and time-series plots for salinity, temperature, and density

Salinity Data and Tools [NASA Aquarius]
Find the data set that most closely corresponds to sea surface salinity patterns

Teaching Physical Concepts in Oceanography: An Inquiry Based Approach [COSEE-Ocean Systems]
This supplement to Oceanography magazine focuses on educational approaches to help engage students in learning and offers a collection of hands-on/minds-on activities for teaching physical concepts that are fundamental in oceanography

Education: Student Outcomes [NASA Aquarius]
Twenty three student outcomes, addressed by Aquarius EPO materials and aligned with National Science Education Standards, North American Association for Environmental Education standards, and Ocean Literacy standards

Precipitation Education [NASA]
Precipitation is a vital component of how water moves through Earth's water cycle, connecting the ocean, land, and atmosphere

NASA Earth Observatory [NASA]
Images, maps, features, news, and notes from NASA Earth Observatory

With a Grain of Salt [Physics Today]
Ocean surface layer captures influence of human activity

Oceans in the News: The Water Cycle [COSEE-Ocean Systems]
A compilation of current news relevant to the water cycle

Oceans in the News: Ocean Salinity [COSEE-Ocean Systems]
A compilation of current news relevant to ocean salinity

This material is based upon work supported by NASA under NASA Jet Propulsion Laboratory Subcontract No. 1459277. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of NASA.

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<< SPURS Home

Home | SPURS: Why? | SPURS: How? | SPURS Webinars | Education and Outreach Resources | Contact Info

SPURS Webinars

From Sailing Ships to Satellites: Studying Salinity Through a Sensor Web

Salinity's Connection to Climate Change and an Accelerated Water Cycle

Follow that Salt! SPURS Results and the Future of Salinity Exploration

Ocean Thinking: Changes in Latitude

Ocean Thinking: From Skin to Deep

Ocean Thinking: Balanced Budget? Oh, Buoy!

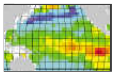
SPURS Results and the Future of Salinity Exploration

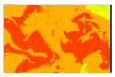
What have we learned about the SPURS site and what's next? The interdisciplinary cruise undertaken by SPURS scientists involved the coordination of an armada of technology - from in-water instruments to shipboard measurements to satellites in orbit around Earth. Dr. Bingham shows us the results of the team's research, including real data collected during the cruise.

Webinar Archive

View other videos by this scientist:


Salinity Balance is Like a Bank Account
[vimeo, 01:19]

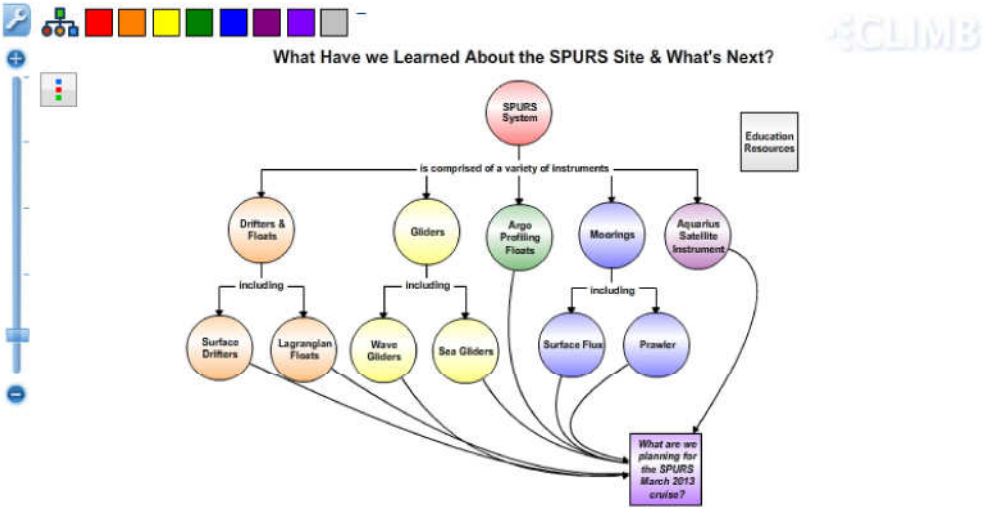

Validating Aquarius
[vimeo, 01:42]


Model Forecasts and Nowcasts
[vimeo, 01:44]

48:37 **HD**

Click here for a transcript of the Q&A portion of this video (PDF, 90KB).

Concept Map: What Have We Learned About the SPURS Site and What's Next?



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Applicable Next Generation Science Standards

- *[MS-ESS2-6]* Develop and use a model to describe how the unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.
- *[HS-ESS2-5]* Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.

About the Presenter

Dr. Fred Bingham is a Professor in the Department of Physics and Physical Oceanography at the University of North Carolina at Wilmington. His research interests include global distributions of sea surface salinity and large scale regional physical oceanography - the Kuroshio, the western North and Equatorial Pacific, and Onslow Bay, North

Carolina.

Profiling Salinity From the Ship [NASA Earth Observatory]
A workhorse of our voyage is the two primary means of measuring salinity from the ship: the Conductivity, Temperature, and Depth (CTD) instruments

Mooring Deployment [NASA Earth Observatory]
The central mooring at the SPURS site is a critical piece of gear - it will provide us with a time series of upper ocean properties at one location over the entire year

The Thermosalinograph,The Bow of the Knorr, and the Chase for Highest Salinity [NASA Earth Observatory]
It is quite an adventure going down to see the inlet for the TSG (thermosalinograph)

Managing SPURS Data [NASA Earth Observatory]
The value of the SPURS dataset comes from analyzing the measurements made by all of the instruments at a variety of time and space scales

Prawlers, Engineers, and the Future of Oceanography at Sea [NASA Earth Observatory]
Seeing the Prawler used in SPURS after years of development is the light at the end of the tunnel

Measurements by Long-Term Autonomous Platforms in SPURS [NASA Earth Observatory]
In order to connect the salinity that Aquarius sees at the ocean surface with processes throughout the ocean, SPURS is devoting resources to understanding of the processes happening in the near-surface layer

Got Salt? NASA's Salt Mapper Toasts First Birthday [NASA JPL]
This interactive gives visitors a 'look under the hood' at the Aquarius spacecraft and a chance to meet some of the 'salt sleuths' on the Aquarius team

NASA Earth Observatory's Experiments [NASA]
Interactive experiments to teach about the art and science of space-based remote sensing

Blowing Ballast [PBS]
This activity offers 1) a hands-on experience in buoyancy, 2) an observation of a working ballast tank, and 3) an operational definition of blowing ballast

Eyes on Salinity [Maryland Department of Natural Resources]
Students will build a hydrometer and practice skills in measuring salinity in this activity about Chesapeake Bay

What's a Water Column Profile? [NANOOS]
In this activity students explore the relationship between temperature, salinity and density in coastal marine waters

How to Use CTD Data [NOAA]
Students use data from the Okeanos Explorer to create and interpret graphs of temperature, salinity, and depth

Monitoring Our Ocean and Atmosphere [NOAA]
By participating in small group discussion, analyzing oceanic and atmospheric data, and summarizing/applying their findings, students will determine the characteristics of the oceans and atmosphere

A Matter of Density [NOAA]
Given CTD data, students will be able to calculate density and construct density profiles of a water column

Adopt a Drifter Program [NOAA]
Adopt a buoy, tracker drifters, and access lesson plans for middle school, high school, and undergraduate students

Ocean Observing With Gliders [Monterey Bay Aquarium Research Institute]
Students will investigate the movement of gliders by performing a simple simulation (Word document)

ROV Grid Search [PBS]
This activity offers 1) an experience that recreates the remote exploration of the sea bottom, 2) a hands-on activity using a remote-controlled vehicle, and 3) an exercise in uncovering targets through methodical searching

How Science Data Are Collected [SPURS]
Answers to questions about how science data are collected, including information about platforms, technology, and the instruments used to make oceanographic measurements on the SPURS cruise

Ocean Instruments [Woods Hole Oceanographic Institution]
How they work, what they do, and how they do it

Instruments [Woods Hole Oceanographic Institution]
Information about sensors, samplers, moorings, buoys, floats, and drifters from Woods Hole Oceanographic Institution

R/V Knorr Scientific Equipment [Woods Hole Oceanographic Institution]
Winches and wire, cranes and overside handling, boats, scientific instrumentation, navigational equipment, and the SeaBeam - necessary items for a successful cruise

Then and Now: The HMS Challenger Expedition and the "Mountains in the Sea" Expedition [NOAA]
A comparison of modern-day exploration with the late 19-century journey of the HMS Challenger illustrates the progress that science has made in ocean exploration

Project NOPP Drifters [National Oceanographic Partnership Program]
Use data from ocean drifting buoys to integrate ocean science into your classroom

Education: Student Outcomes [NASA Aquarius]
Twenty three student outcomes, addressed by Aquarius EPO materials and aligned with National Science Education Standards, North American Association for Environmental Education standards, and Ocean Literacy standards

How NASA Studies Water [NASA]
NASA missions collect data about the global water cycle, including rain, floods, and tides - using this data, scientists develop or refine their theories about the how air, water, temperature changes, and gravity interact

Physical Oceanographic Measurements [OceanTeacher]

A training resource for data and information management related to oceanography and marine meteorology

This material is based upon work supported by NASA under NASA Jet Propulsion Laboratory Subcontract No. 1459277. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of NASA.

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